UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MISSOURI
(Eastern Division)

LEGGETT & PLATT, INCORPORATED; and L&P PROPERTY MANAGEMENT COMPANY Plaintiffs, v. VUTEK INC., Defendant.	Case No. 4:05 CV 788
VUTEK INC., Counter-Claimant, v. LEGGETT & PLATT, INCORPORATED; and L&P PROPERTY MANAGEMENT COMPANY Counter-Defendants	

DECLARATION OF ROGER D. McWILLIAMS IN SUPPORT OF VUTEK'S MOTIONS FOR SUMMARY JUDGMENT

I, Dr. Roger D. McWilliams, declare:

1. I am a Professor of Physics at the University of California, Irvine and a Fellow of the American Physical Society. I received my Ph.D. in Plasma Physics from Princeton University. I have over 25 years of experience measuring properties of light and its interaction with matter, including heating and thermal deformation of matter. I

am the owner of McWilliams Scientific, and I have been retained by VUTEk, Inc. to provide an expert report and testimony in this matter.

2. Attached as **Exhibit A** is a true and correct copy of my Technical Expert Report in this matter. All statements in my Technical Expert Report are true and correct.

3. Attached as **Exhibit B** is a true and correct copy of my Rebuttal Expert Report in this matter. All statements in my Rebuttal Expert Report are true and correct.

4. I have tested the lamp assemblies on VUTEk's PressVu UV 180, 200, and 320. The results of my tests are articulated in my Technical Expert Report and Rebuttal Expert Report attached hereto.

5. On 19-20 July 2006, I measured the temperature produced on substrates during actual printing on the PressVu UV 180, 200, and 320 printers with and without the thin film coatings in their respective lamp assemblies. I took temperature readings using a calibrated thermocouple on the same spot of every print. I also used a calibrated thermopile to crosscheck the temperature readings of the thermocouple. I found that the dichroic coatings on the VUTEk 200 and 320 lamp assemblies increase the temperature on the print substrates as compared to the lamp assemblies without dichroic thin film coatings. These methods of measuring the printed substrate temperature are a direct measure of the heating caused by all heating radiation hitting the print substrate. There are no portions of the electromagnetic spectrum missing from this test procedure, these are actual print conditions and include the total ultraviolet, total visible, and total infrared spectrum of heating radiation hitting the print surface. All of my measurements were consistent, regardless of whether I used a thermocouple or a thermopile. I also found that the thin film coatings on the VUTEk 180 lamp assembly decrease the temperature on the print substrates as compared to the lamp assemblies without dichroic film coatings.

6. The tests explained above are consistent with and support the results of an earlier bench test I conducted. Specifically, on 28 March 2006, I conducted a bench test of the PressVu UV 180, 200, and 320 lamp assemblies using a lamp test fixture at

VUTEk's facilities. In my test I allowed the lamps to heat until they reached thermal equilibrium. In accordance with well known principles of thermodynamics, once the lamps reach this state, the quartz window at the bottom of the lamps emits the vast majority of infrared (IR) radiation spectrum output by the lamp assemblies which hits the print substrate. That is, the lamp bulb transfers energy to the quartz window, which in turn heats up and then emits IR radiation onto the printing substrate. Once equilibrium has been reached, the IR radiated by the quartz window represents all but a small fraction of the infrared radiation from the lamp assembly impinging upon the substrate.

7. In order to measure this radiation without allowing the visible and ultraviolet radiation to disturb the test instrument, I closed the lamp shutters briefly before taking measurements. In these few seconds after shuttering the lamps, the quartz blackbody radiation accurately represents the IR output by the lamps when the shutters are open. Scientists commonly measure IR output from light sources using this method. Otherwise, if the light source is allowed to continue to directly impinge visible and ultraviolet light on the measuring device, the filters used on these devices will heat up by absorbing visible and ultraviolet radiation thereby giving a falsely high infrared reading.

8. Specifically, I measured the IR intensity of the PressVu lamp assemblies with and without thin film dichroic coatings on the reflectors and quartz windows using the same bulbs and operating conditions for each lamp type. That is to say, the dichroic assemblies were swapped in or out but lamp bulb and power supply assembly remained the same for both test conditions of with or without dichroic assemblies. As reported in my Expert Report, the results of my testing demonstrate that the PressVu 200 and 320 lamp assemblies produced more IR intensity with the thin films present than when they were removed. The PressVu UV 180 lamp assembly, however, produced less IR radiation intensity with the thin films present than when they were removed. These results are consistent with the print substrate temperature observations that the presence of the thin films on the PressVu 200 and 320 increased print substrate temperatures over

temperatures found when the thin films were absent, and that PressVu 180 thin film usage caused reduced print substrate temperatures under temperatures found without thin films.

9. The mechanical architecture and spectral intensity properties of PressVu 200 and 320 lamp assemblies are significantly different than that of the PressVu 180.

10. The Hönle lamp assembly on the PressVu UV 180 uses a six-inch metal halide bulb, dichroic thin film coating on the reflective mirrors, and a lower quartz window without a dichroic film coating.

11. During printing on the PressVu 180, the only material between the bulb and the printing substrate is a quartz window without thin film coating.

12. The PressVu UV 200 lamp assembly uses a 4-inch metal halide bulb, a dichroic thin film coating on the extruded aluminum reflective mirrors above the lamp and a thin film coating on the lower quartz window through which light passes (and from which it is radiated) at the bottom of the lamp assembly.

13. The PressVu 320 lamp assembly uses a 6-inch mercury bulb, a dichroic thin film coating on the extruded aluminum reflective mirrors above the lamp and a thin film coating on the lower quartz window through which light passes (and from which it is radiated) at the bottom of the lamp assembly.

14. The lamp assemblies on the PressVu 200 and 320 do not utilize filters or narrow bandwidth radiation to avoid heating a substrate and causing deformation.

I make this declaration under penalty of perjury under the laws of the United States, executed the 30th day of September, 2006, at Irvine, California.

Roger D. McWilliams

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on October 2, 2006, the foregoing DECLARATION OF ROGER D. MCWILLIAMS IN SUPPORT OF VUTEK'S MOTIONS FOR SUMMARY JUDGMENT was filed electronically with the Clerk of Court to be served by operation of the Court's electronic filing system upon the following:

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By: /s/ Russell B. Hill